



# **Recording progress in agricultural conservation on Chesapeake Bay farms using USDA data records**

**W. Dean Hively, Ph.D.  
U.S. Geological Survey  
Eastern Geographic Science Center**

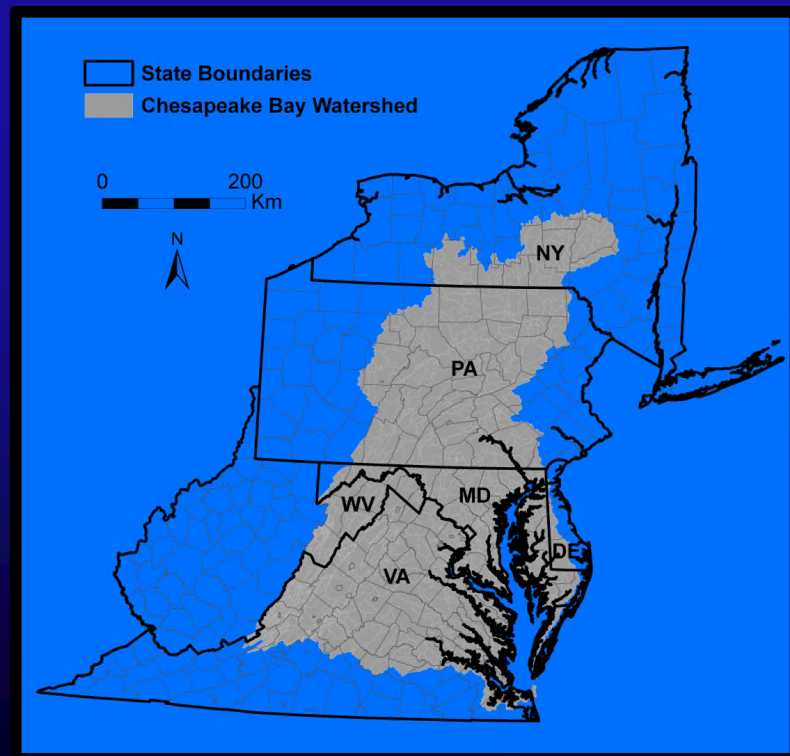
**with Olivia H. Devereux  
and Peter J. Claggett**

# Reporting USDA agricultural conservation data for Chesapeake Bay farmlands

- Assist in data reporting for Chesapeake Bay agricultural conservation practices by obtaining privacy-protected farmland data from USDA and aggregating it for public release
- Coordinate with USDA agencies, EPA, and state jurisdictions to document and improve data handling protocols

## Products:

- Compile dataset each October to support the Annual Progress Review
- Transfer privacy-protected data to interested USGS scientists (showcase watersheds) for water quality analysis
- USGS Open File Report 2013-1287 documents protocols



# USGS is a 1619 Conservation Cooperator

**1619 Conservation Cooperator Agreements were signed with FSA and NRCS in 2010**

- **Allows access to privacy protected conservation data for all Chesapeake Bay counties**
- **Supports the goal of obtaining a consistent and well-defined USDA dataset covering all Chesapeake Bay jurisdictions**
- **A Data Handling Agreement can be signed by USGS employees, allowing access to the site-specific dataset**
- **Valid through 2015**

# Reporting the Implementation of Agricultural Conservation Practices

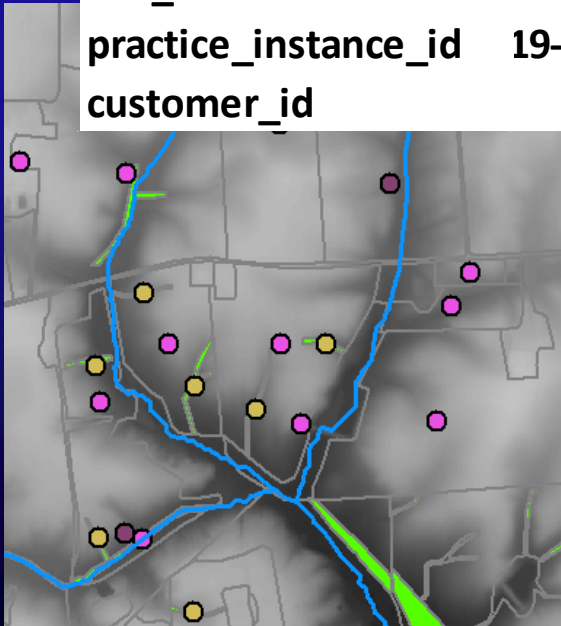
- State jurisdictions are responsible for milestones under TMDL (Total Maximum Daily Load) and WIP (Watershed Implementation Plans)
- State jurisdictions report to EPA in the Annual Progress Review
- Access to information on USDA practices has been variable
- In 2010, USGS was asked to play an intermediary role to access privacy protected USDA data and aggregate the datasets for public use

# USGS Project Objectives

- Obtain a complete, consistent dataset of USDA-sponsored conservation practices (FSA, NRCS) for Chesapeake Bay farms
- Assist the Chesapeake Bay state jurisdictions with reporting USDA data to the Chesapeake Bay Program Partner's Annual Progress Review
- Integrate site-specific conservation data into USGS watershed studies

# Example data records

practice_code	340	516	578
practice_name	Cover Crop	Livestock Pipeline	Stream Crossing
program_name	CTA	CBWI	CBWI
applied_amount	10	400	1
measurement_unit	Acres	Feet	Number
applied_date	3/3/2010	11/30/2012	6/18/2012
latitude	38.67023	38.69509	38.69509
longitude	-78.62601	-78.63105	-78.63105
huc_12	20700060204	20700060204	20700060204
practice_instance_id	19-C45E-4A71-AA6F-0CEF1E'1-24B3-4D15-8603-66020'-8ACC-44EB-8672-D0B6		
customer_id	1857014	10517633	10517633



*These example data are randomized to protect privacy*

# Steps in the process

Obtain USDA data from Federal or State NRCS and FSA officials

Address USDA double counting, select reportable records

Aggregate records to maintain 1619 privacy requirements

Crosswalk USDA practice codes to NEIEN practice categories

Integrate data with state records and address double counting

Submit aggregated data to NEIEN/Scenario Builder

USGS

Jurisdictions

## 2013 accomplishments

- Obtained and processed NRCS and FSA conservation practice datasets (2006-2012)
- Provided county aggregated totals to state jurisdictions for use in the 2012 Chesapeake Bay Program Partners' Annual Progress (DE, PA, WV)
- Published OFR documenting methods used by USGS and jurisdictions to report Chesapeake Bay conservation data

### Integrating Federal and State Data Records to Report Progress in Establishing Agricultural Conservation Practices on Chesapeake Bay Farms

By W. Dean Hively, Olivia H. Devereux, and Peter Claggett



## 2014 objectives

### Aggregation to the watershed scale to support landscape science and water quality trends analysis

- Data summaries for all NHD segments in Chesapeake Bay watershed
- Data aggregation for all HUC12 watersheds in Chesapeake Bay watershed
- Exploring options for public web access using ChesapeakeStat
- Data aggregation for 19 Pennsylvania watersheds
- Data aggregation for three Showcase Watersheds

# Chesapeake Bay subwatersheds

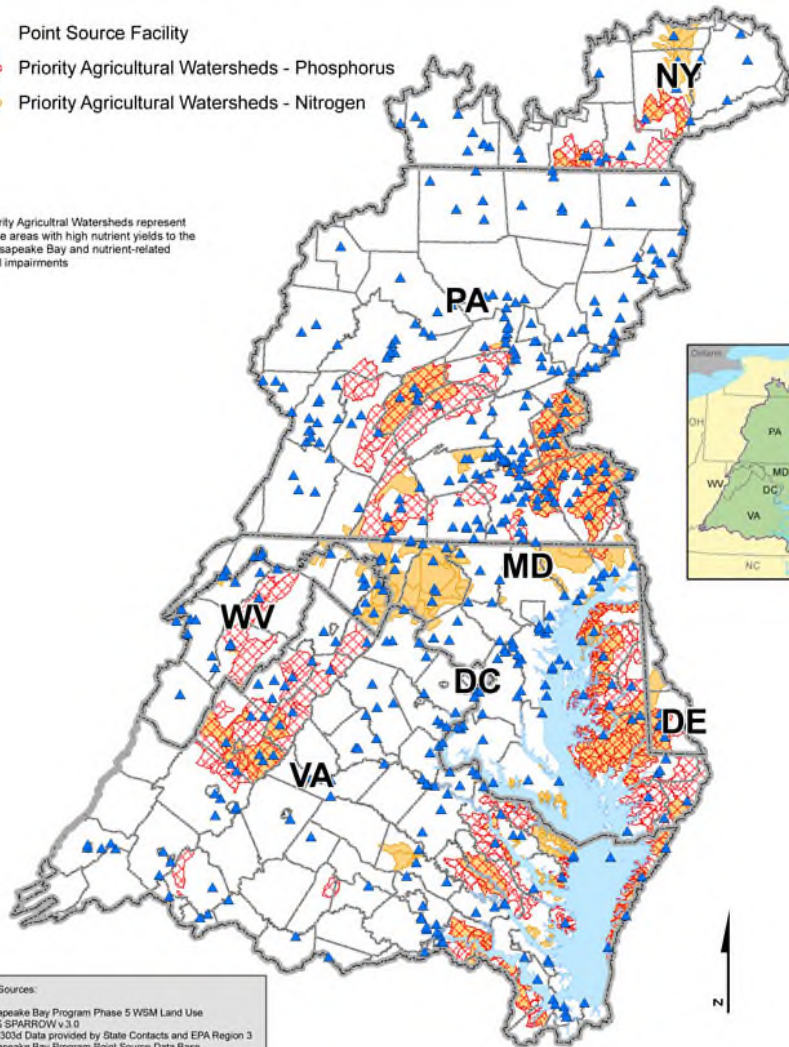
## Point Sources and Priority Agricultural Watersheds

Chesapeake Bay Watershed



- ▲ Point Source Facility
- ▨ Priority Agricultural Watersheds - Phosphorus
- Priority Agricultural Watersheds - Nitrogen

Priority Agricultural Watersheds represent those areas with high nutrient yields to the Chesapeake Bay and nutrient-related local impairments



### Data Sources:

Chesapeake Bay Program Phase 5 WSM Land Use  
USGS SPARROW v3.0  
State 303d Data provided by State Contacts and EPA Region 3  
Chesapeake Bay Program Point Source Data Base

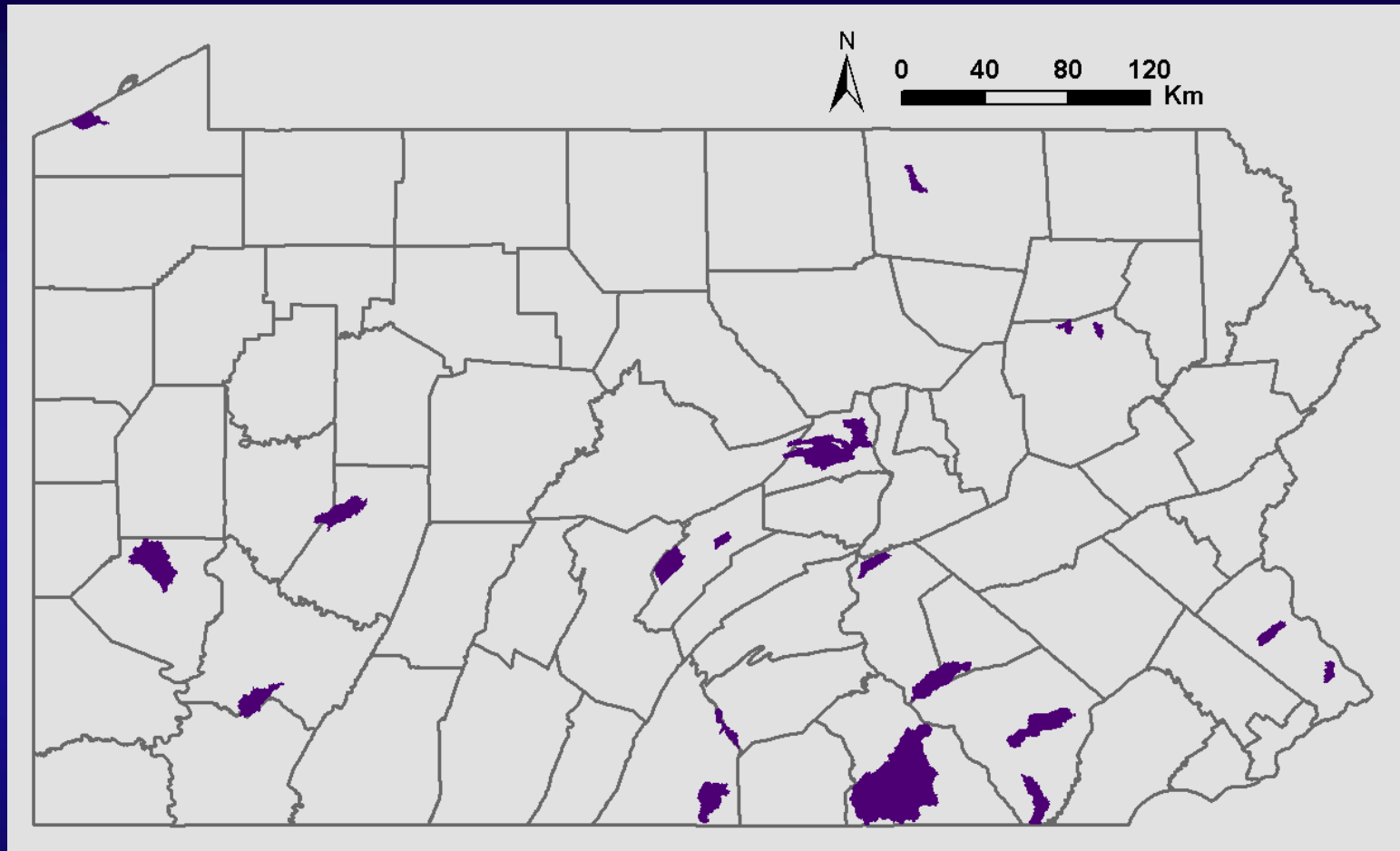
For more information, visit [www.chesapeakebay.net](http://www.chesapeakebay.net)  
Disclaimer: [www.chesapeakebay.net/terms\\_of\\_use.htm](http://www.chesapeakebay.net/terms_of_use.htm)

Conservation data totals for NHD segments will be compiled for use by Sparrow modelers

Data aggregation to HUC12 will be used to evaluate trends in conservation implementation with focus on priority watersheds

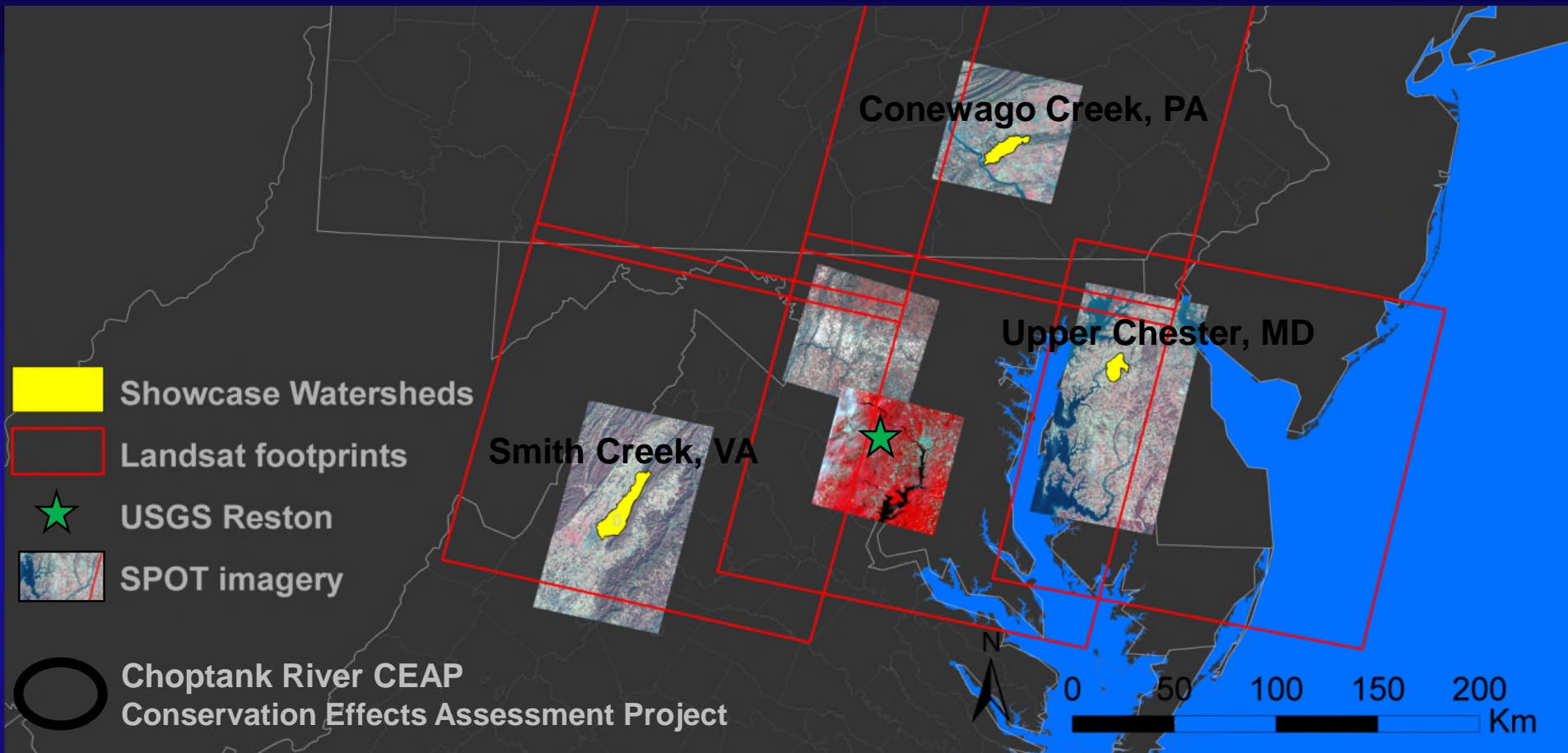
Water quality improvements might be expected in watersheds with heavy implementation

# Pennsylvania 319 watersheds



- Conservation s data aggregation for 19 watersheds transferred to Pennsylvania Department of Environmental Protection to report progress toward conservation objectives in EPA 319 watersheds

# Showcase watersheds



- In these watersheds NRCS has been prioritizing implementation, and USGS is focusing on water quality analysis
- Aggregated conservation data will be included in a USGS SIR documenting baseline conditions in the watersheds (Hyer et. al.)



# Smith Creek showcase watershed

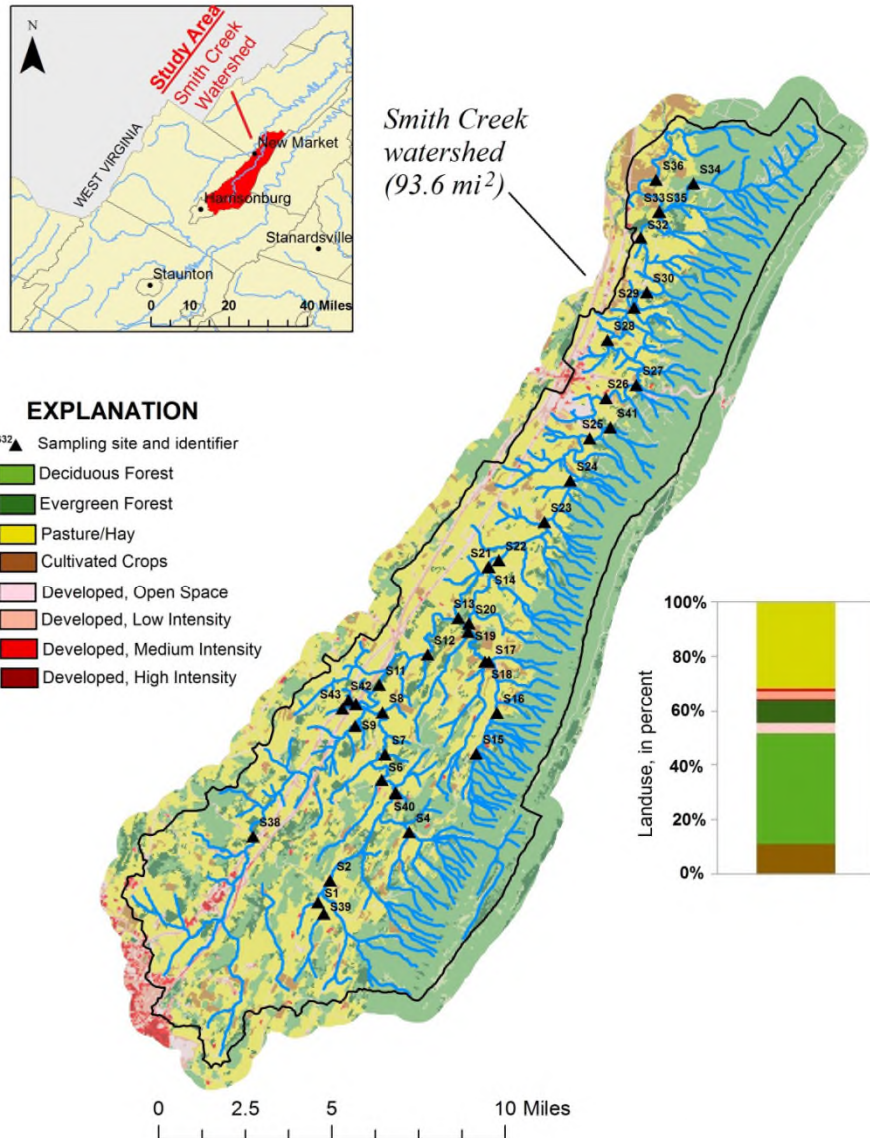
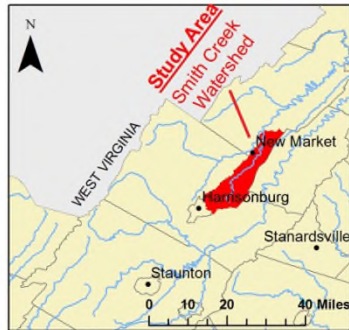


Figure 2. Characterization of the land use within the Smith Creek Watershed

# Smith Cree



Smith Creek watershed  
(93.6 mi<sup>2</sup>)

## EXPLANATION

▲ Sampling site and identifier

Deciduous Forest

Evergreen Forest

Pasture/Hay

Cultivated Crops

Developed, Open Space

Developed, Low Intensity

Developed, Medium Intensity

Developed, High Intensity

## Top 10 USDA practices in the Smith Creek watershed

### Practice Code

### Practice

590 Nutrient Management

340 Cover Crop

328 Conservation Crop Rotation

595 Integrated Pest Management (IPM)

633 Waste Recycling

329 Residue and Tillage Management, No-Till

528, 528A Prescribed Grazing

472 Access Control

382 Fence

614 Watering Facility

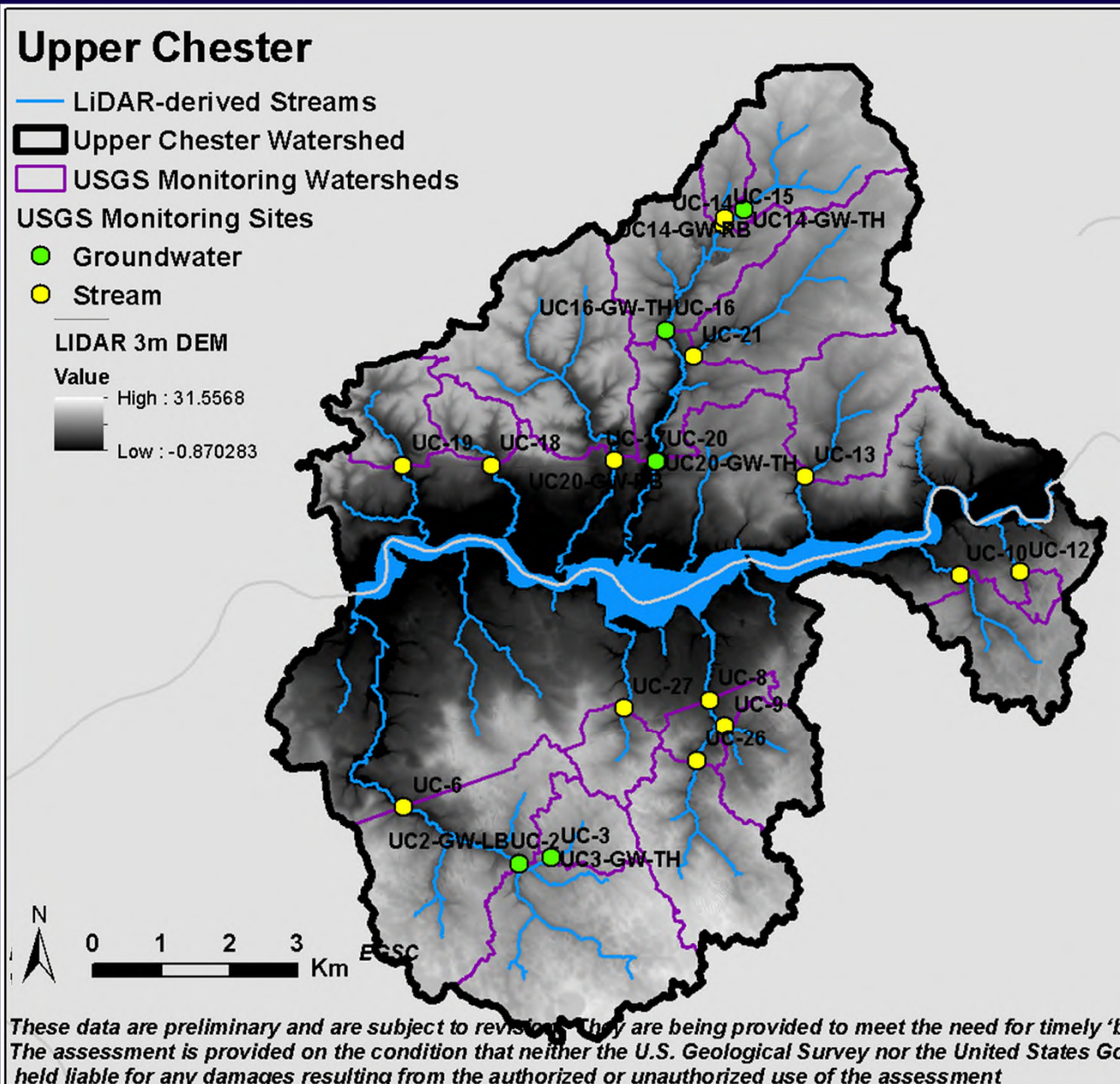
## Trends in implementation of USDA conservation practices in the Smith Creek watershed

*These data are preliminary and subject to revision*

Program	2006	2007	2008	2009	2010	2011	2012	2013	Total
Chesapeake Bay Watershed Initiative					6	67	164	155	392
Environmental Quality Incentive Program	24	21	10	5		36	26	8	162
Wildlife Habitat Incentives Program				5		15	3		23
CTA - Grazing Lands Conservation	79	27							107
Conservation Reserve Program	16	2		1		1			37
Total funded NRCS practices	119	50	10	11	6	119	193	163	721
Conservation Technical Assistance <sup>b</sup>	43	62	45	145	47	118	76	73	727
Total practices	162	112	55	156	53	237	269	236	1448

Figure 2. Chara

# Upper Chester showcase watershed





# Upper Chester show

## Top 10 USDA practices in Upper Chester

Cover Crop

Nutrient Management

Conservation Crop Rotation

Integrated Pest Management (IPM)

Upland Wildlife Habitat Management

Residue and Tillage Management, No-Till

Wetland Restoration

Wetland Wildlife Habitat Management

Waste Recycling

Shallow Water Development and Management

## Upper Chester

— LiDAR-derived Streams  
 □ Upper Chester Watershed  
 □ USGS Monitoring Watersheds

USGS Monitoring Sites

● Groundwater

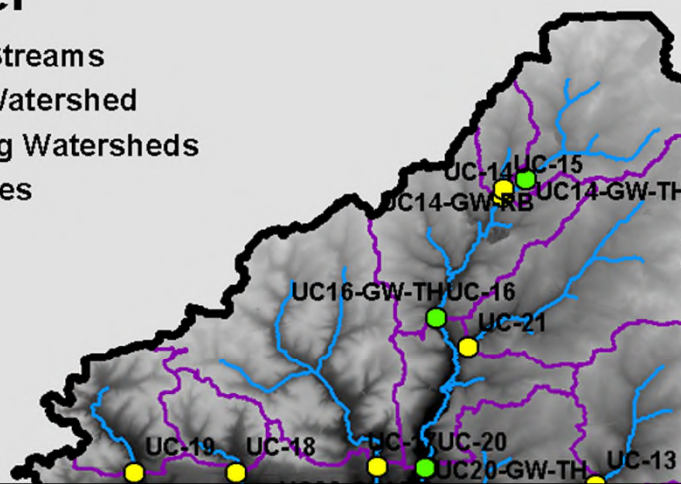
● Stream

LIDAR 3m DEM

Value

High : 31.5568

Low : -0.870283



## Trends in implementation of USDA conservation practices in the Upper Chester watershed

*These data are preliminary and subject to revision*

Program	2006	2007	2008	2009	2010	2011	2012	2013	Total
Chesapeake Bay Watershed Initiative							35	83	119
Conservation Reserve Program		2	1	1	2	14		1	21
Conservation Security Program	26	5							31
Environmental Quality Incentive Program	1	54	6	20	6	4	9	158	266
Wildlife Habitat Incentives Program		2	9	11	5	1			28
Total practices funded by NRCS	27	63	16	32	14	19	46	244	471
Conservation Technical Assistance	137	69	142	329	99	267	332	264	1708
Total practices	191	195	174	393	127	305	424	752	2650



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These data are  
 The assessment  
 held liable for



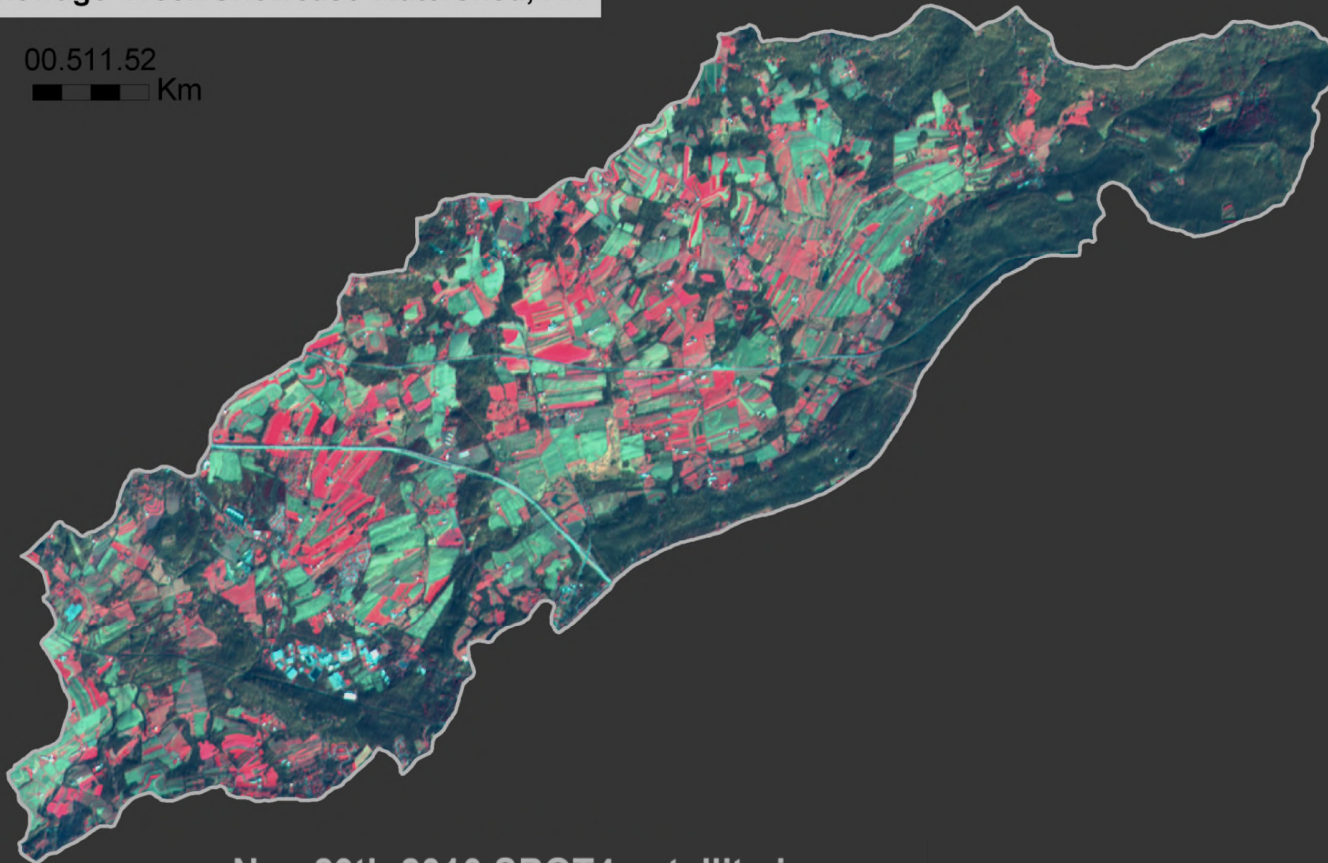
# Conewago Creek showcase watershed

D. Hively, USGS EGSC, USDA-ARS Choptank CEAP, 4-19-2012

Conewago Creek Showcase Watershed, PA



00.511.52  
Km



Nov 29th 2010 SPOT4 satellite imagery

1011291543171104622269\_1GST\_sh\_toa\_ndvi\_sm9p\_tif.tif

# Conewago Creek

## Top 10 practices in the Conewago Creek watershed

Practice Code	Practice name
328	Conservation Crop Rotation
590	Nutrient Management
329	Residue and Tillage Management, No-Till
412	Grassed Waterway
600	Terrace
511	Forage Harvest Management
606	Subsurface Drain
620	Underground Outlet
587	Structure for Water Control
645	Upland Wildlife Habitat Management

D. Hively, USGS EGSC, USDA-ARS Choptank CEAP, 4-19-2012

Conewago Creek Showcase Watershed, PA



## Trends in implementation of USDA conservation practices in the Conewago Creek watershed

*These data are preliminary and subject to revision*

Program	2006	2007	2008	2009	2010	2011	2012	2013	Total
Chesapeake Bay Watershed Initiative					26	25	27	40	118
Environmental Quality Incentive Program		37	2	3	12	3	3	9	80
CTA - Grazing Lands Conservation	8	4							12
Conservation Reserve Program			2						4
Conservation Security Program	3								3
Total practices funded by NRCS	11	4	2	0	26	25	27	41	138
Conservation Technical Assistance	55	64	32	97	28	78	49	46	486
Total practices	66	105	36	100	66	106	79	96	704

# Summary

- **Site-specific data are available to USGS scientists who sign a data handling agreement**
  - Use to evaluate the effect of conservation practices on water quality in Chesapeake Bay
- **Aggregated data are available to public if farm privacy is protected**
  - Whenever >4 farmers are implementing a practice in the area of interest, aggregated totals can be reported for that area
- **Data are available from 2005 to present**
  - Each data record includes a practice applied date and an associated lifespan

# Caveats

- **The dataset is a moving target**
  - **NRCS is undertaking a conservation data streamlining initiative**
  - **We have just obtained a more thorough dataset with better ancillary information on land use, etcetera**
  - **Although NRCS standards are consistent, interpretation of data recording requirements varies from state to state**
  - **There is, of course some inaccuracy in this complex dataset**
  - **Quality control needed to remove occasional errors such as wrong units**
  - **Data are not available prior to 2005**
  - **Does not include conservation practices for which USDA had no involvement**

# Thank you ~ questions?

**W. Dean Hively**

**Research Physical Scientist**

**USGS Eastern Geographic Science Center**

**Stationed at USDA-ARS, Beltsville, MD**

**301-504-9031, [whively@usgs.gov](mailto:whively@usgs.gov)**

**OFR available at: <http://pubs.usgs.gov/of/2013/1287/>**

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